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PATENT & TRADEMARK OFFICE Inventor(s): William Sharpe et al.

Application No.: 09/647,266

Confirmation No.: 5360

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Examiner: Chen, Chongshan

Title: SIMILARITY SEARCHING FOR DOCUMENTS

Group Art Unit: 2172

Mail Stop Appeal Brief-Patents
Commissioner For Patents
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Sir:

Transmitted herewith in triplicate is the Appeal Brief in this application with respect to the Notice of Appeal filed on Sept. 15, 2003.

The fee for filing this Appeal Brief is (37 CFR 1.17(c)) \$330.00.

(complete (a) or (b) as applicable)

The proceedings herein are for a patent application and the provisions of 37 CFR 1.136(a) apply.

() (a) Applicant petitions for an extension of time under 37 CFR 1.136 (fees: 37 CFR 1.17(a)-(d) for the total number of months checked below:

() one month	\$110.00
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() The extension fee has already been filled in this application.

() (b) Applicant believes that no extension of time is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition and fee for extension of time.

Please charge to Deposit Account 08-2025 the sum of \$330.00. At any time during the pendency of this application, please charge any fees required or credit any over payment to Deposit Account 08-2025 pursuant to 37 CFR 1.25. Additionally please charge any fees to Deposit Account 08-2025 under 37 CFR 1.16 through 1.21 inclusive, and any other sections in Title 37 of the Code of Federal Regulations that may regulate fees. A duplicate copy of this sheet is enclosed.

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Respectfully submitted,

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

#12
1 of 3

Applicant: William Sharpe et al.

Serial No: 09/647,266

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BRIEF ON APPEAL

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Appellants are submitting the present appeal brief within two months of the Notice of Appeal, which was filed on September 15, 2003.

Real Party in Interest

Hewlett-Packard Company is the owner of the present invention under the assignment executed on September 18, 2000 and recorded on September 27, 2000.

Related Appeals and Interferences

None

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Status of Claims

Claims 1-5 and 7-17 are the subject of this appeal. No other claims are pending.
Claim 6 was previously cancelled.

Status of Amendments

No amendment was filed subsequent to the final rejection.

Summary of Invention

The first aspect of a method of searching a database to find documents similar to a query document according to the present invention is recited in independent claim 1. The second aspect of the present invention is recited in independent claim 14. These aspects are best depicted in Figures 2 and 3 and summarized from page 2, line 16 to page 3, line 2 of Appellant's specification. These aspects include a layout data type. The layout data type is best described from page 7, line 11 to page 8, line 14 with reference to Figure 3 of Appellant's specification.

Generally, a method of searching a document, such as a database representative of content on the World Wide Web, to find documents similar to a query document, involves a step of decomposing the query document into elements of different data types. After this, for one or more of the elements in a first data type, a first data type similarity search is conducted to return match results from the database for the one or more elements in the first data type. For one or more of the elements in a second data type, a second data type similarity search is conducted to return match results from the database for the one or more elements in the first data type. The match results from the different data types are combined with an appropriate weighting to provide query document match

results. Data types can include text, picture, and graphics, and also the layout of the overall document.

A first aspect of the invention provides a method of searching a database to find documents similar to a query document. The query document is decomposed into elements of different data types, including a layout data type indicating the arrangement of the different data types within the query document. For one or more of the elements in a first data type, a first data type similarity search is conducted to return match results from the database for the one or more elements in the first data type. For one or more of the elements in a second data type, a second data type similarity search is conducted to return match results from the database for the one or more elements in the second data type. The match results from the first data type similarity search and the second data type similarity search are combined to provide query document match results.

Advantageously, results from each query document match may be combined to allow progressive refinement of queries using any of the data types either singly or in further combination.

In a second aspect, the invention provides a method of searching a database to find documents similar to a query document. The query document is decomposed into elements of different data types. A layout element in a layout datatype is determined from the spatial arrangement of the elements in the document. For the layout element, a layout similarity search is conducted to return match results from the database for the layout element.

In addition to the separate elements provided by the page decomposition shown in Figure 1 (graphic 11, text block 12, and picture 13), further information is provided in the arrangement of the different elements within the document. As is shown in Figure 3, a further output available from page decomposition is a data type plan 31 representing the document as a line art block, a text block, and an image block, arranged vertically in sequence - decomposition into layouts is discussed in US Patent No. 6,002,798.

However, the present inventors have appreciated that this data type plan can itself be used as a layout data type. This allows yet another element - the layout data type element - to be used in search 32 of a database (provided that layout information is available in or derivable from the database entries).

Layout similarity searching, whether used on its own or as one of the elements in a combined search as described in the first aspect of the invention, is more powerful if a number of different data types are used for text and for overall document type. Using a rule-based approach, different text blocks and whole documents, especially in the case of formal workflow documents, can be assigned particular functions with relatively high confidence. For example, it is well known that isolated text blocks at the top of a page and handwriting at the bottom are suggestive of a letter, and so different spatial regions of the document can be assigned to appropriate functional fields (address, letter text etc) - likewise, table and currency totals in a document can be identified as a discrete element, and their presence limits the document to another group (bill, quote or invoice). Layout searching can thus involve matching to templates representing different workflow document types (thus promoting matching of a document determined to be a letter against other letters). An appropriate mechanism is to normalise a layout for size, orientation and skew, and then carrying out an "exclusive or" operation on the query element and the layout records in the database - this will be effective provided that all records involved have a broadly common format.

Issues

Issue 1—Whether claims 1-5 and 7-13 are patentable under 35 U.S.C. §103(a) over U.S. Patent No. 6,243,713 B1 to Nelson ("Nelson") in view of U.S. Patent No. 6,460,036 B1 to Herz ("Herz").

Issue 2—Whether claims 14-17 are patentable under §103(a) over the combination of Nelson and Herz.

Grouping of Claims

Claims 1-5 and 7-13 form Group I and claims 14-17 form Group II. For each group of rejections that appellant contests herein that applies to more than one claim, such additional claims, to the extent separately identified and argued below, do not stand or fall together.

Argument

The Examiner's reading of Nelson in the Final Office Action betrays a misunderstanding of the nature of the claimed phrase "layout data type".

Generally, Nelson describes a two phase process consisting of an indexing phase 102 and a retrieval phase 104. The indexing phase 102 produces a multimedia index 140. The retrieval phase 104 selects and scores documents from the multimedia index 140 using queries, such as a query to find the word "sunset" within 10 words of a picture of a sunset. (Nelson, abstract, col. 5 line 9 to col. 7 line 67). This is best shown in Figure 2.

Nelson describes an indexing process in which "various multimedia components of a compound document are identified as to their types and their positions within the document...." and are "converted into one or more tokens, each with additional reference data. A token represents an abstraction of the multimedia component, and the reference data preferably describes the position of the multimedia component in the document (e.g. its character position or offset).... The various tokens . . . represent different types of multimedia data." (Nelson, col. 3, lines 21-24, lines 29-32, and lines 47-49).

In Nelson, multimedia data types are the type of multimedia, e.g. text, image, audio, and video. (Nelson, col. 5, lines 52-55). However, Nelson has no data type to

represent the layout of a document, such as a letter, a bill, a quote, or an invoice. (Appellant's specification, page 8, lines 4-8).

The distinction between a multimedia data type and a "layout data type" appears to be one which the Examiner found rather subtle and missed. A "layout data type" is a higher level of abstraction than a multimedia data type. Nelson breaks a document into parts with each part having a multimedia data type, while the claimed invention in addition to breaking the document into parts, also considers the whole, i.e. the type of document by using a "layout data type". This provides many advantages over Nelson, including searches that properly represent the full document and more efficient searching by narrowing searches to documents having a particular type of layout.

In addition, Appellants have carefully reviewed Herz and cannot find any disclosure of such a "layout data type".

Issue 1—Whether claims 1-5 and 7-13 are patentable under §103(a) over the combination of Nelson and Herz

Claim 1 recites, *inter alia*, "decomposing the query document into different data types, including a layout data type indicating the arrangement of the different data types within the query document". The Office Action appears to wrongly equate these elements of claim 1 with Nelson's multimedia data type and position by citing several figures and sections in Nelson. (Office Action, page 3, para. 4).

First, the Office Action cites Figure 3, which shows the multimedia query "(sailboat or ship or <picture> /shape) w/10 (sunset or sunrise or <picture> / color)". This query searches for the word "sailboat" or the word "ship" or a picture having a ship's shape within 10 words of the word "sunset" or the word "sunrise" or a picture having certain colors. In Figure 3, "the query 150 includes both text 151 and image 157 components, and a number of query operators 152 defining both logical relationships 152 and

proximity relationships 156 between the multimedia components." (Nelson, col. 6, lines 44-48). In other words, the query searches for text or pictures within 10 words of each other that have certain values. This is not the same as a query including a layout data type. The claimed layout data type indicates the arrangement of the whole query document. For example, a layout data type of "letter" where the arrangement includes a date at the top, handwriting at the bottom, and other spatial regions assigned to functional fields (address block, body text, etc.) is distinctly different from a Nelson-type query that would describe each component of a letter in terms of its multimedia data type and position in the document. (Appellant's specification, page 8, lines 3-10). How would a Nelson-type query indicate the relative position of the signature to, say, the date? The number of words between them would depend on the length of the letter, so unless the letter were of determinate length it would not work. Also, a Nelson-type query is not guaranteed to find only letters.

Just after the section cited by the Examiner, Nelson states "Once the compound query is input by the user, it is separated into its multimedia components, as during indexing." (Nelson, col. 6, line 66 to col. 7, line 1). Figure 3 shows a compound query. (Nelson, col. 6, lines 35-37, and lines 43-44). The fact that the compound query is separated into its multimedia components is clear evidence that the compound query in Figure 3 is a very different thing from the claimed "layout data type".

Next, the Office Action cites Figure 4, which "is a flowgraph of the process of separating a compound document into multimedia components". (Nelson, col. 4, lines 27-28). The output of Figure 4 is "the ordered list 440 of multimedia components", such as text, image, video, and audio. (Nelson, Figure 4, elements 100 and 440, col. 8, lines 55-56). The claimed "layout data type indicating the arrangement of the different data types within the query document" is not the same as Nelson's ordered list of multimedia components. Nelson's list simply lists the parts of a document, while the claimed "layout data type" considers the format or arrangement to determine the type of the whole document.

The Office Action cites Figure 5, which shows "a further flow-graph of one simple method of locating multimedia components within a document." (Nelson, col. 9, lines 9-11). Figure 5 is described in Nelson at col. 9, which the Office Action partially cites. (Nelson, col. 9 lines 18-53). Nelson discloses a method of using tags in documents, such as a "\pict" tag in an RTF document that indicates a picture. The method results in identifying the type of multimedia component and its location in the document. The claimed method step "decomposing the query document into different data types, including a layout data type indicating the arrangement of the different data types within the query document" is not the same identifying the multimedia type and position of each component, because the "layout data type" considers the whole arrangement and the type of the document, not just the parts, and has many advantages over the Nelson method.

Finally, the Office Action cites "Compound documents are separated into constituent multimedia components of different data types, such as text, images, video, audio/voice, and other data types." (Nelson, col. 5, lines 52-55). The claimed "layout data type" is not the same as the Nelson multimedia data type, which indicates whether a component is text, image, video, etc. The "layout data type" indicates the arrangement of the different data types within the query document, considering the whole arrangement, not just the parts, which has many advantages over the Nelson data type.

In addition, Appellants have carefully reviewed Herz and cannot find any disclosure of the claimed "layout data type".

Thus, the combination of Nelson and Herz does not teach or suggest every element of claim 1. Therefore, Appellants respectfully request reversal of the rejection of claim 1.

Claims 2-5 and 7-13, which depend directly or indirectly from claim 1, are considered allowable by virtue of their dependencies, because they inherit the patentable

subject matter of claim 1. Therefore, Appellants respectfully request reversal of these rejections as well.

Issue 2—Whether claims 14-17 are patentable under §103(a) over the combination of Nelson and Herz

Claim 14 recites, *inter alia*, "determining a layout element in a layout datatype from the spatial arrangement of the elements in the document; and for the layout element, conducting a layout similarity search to return match results from the database for the layout element". The Office Action appears to wrongly equate these elements of claim 14 with performing a search query as shown in Figure 3 and described in col. 6, lines 35-65. (Office Action, page 6).

Figure 3 shows the multimedia query "(sailboat or ship or <picture> /shape) w/10 (sunset or sunrise or <picture> / color)". This query searches for the word "sailboat" or the word "ship" or a picture having a ship's shape within 10 words of the word "sunset" or the word "sunrise" or a picture having certain colors. In Figure 3, "the query 150 includes both text 151 and image 157 components, and a number of query operators 152 defining both logical relationships 152 and proximity relationships 156 between the multimedia components." (Nelson, col. 6, lines 44-48). In other words, the query searches for text or pictures within 10 words of each other that have certain values. This is not the same and not as useful as the claimed "conducting a layout similarity search to return match results from the database for the layout element" where the claimed "layout element" indicates "the spatial arrangement of elements in the document". For example, in a "letter" spatial arrangements include a date at the top, handwriting at the bottom, and other spatial regions assigned to functional fields (address block, body text, etc.). (Appellant's specification, page 8, lines 3-10). The spatial regions are groupings based on layout and logical relationships of parts to the whole, as opposed to Nelson's index based on whether something is text or a picture or simply its line number in the document. Layout searching thus involves matching to templates representing different

workflow document types (thus promoting matching of a document determined to be a letter against other letters). (Appellant's specification, page 8, lines 8-10). The claimed "layout similarity search" considers the whole layout of the document, while Nelson only considers the individual parts. A "layout similarity search" is more concise and efficient than Nelson's searching for each isolated part. A Nelson-type search more primitively searches for certain words and pictures at certain positions in a document, while the claimed invention searches documents that look like letters for those words and pictures.

Neither Figure 3 nor the description of Figure 3 in Nelson, describes the claimed step of "determining a layout element in a layout data type from the spatial arrangement of the elements in the document." This is a separate step in claim 14 from "conducting a layout similarity search to return match results from the database for the layout element", even though the Examiner rejects them together. (Office Action, page 6). In Nelson, there are indexing and retrieval steps. (Nelson, abstract) Figure 3 and its description in col. 6 are part of retrieval, as indicated by "Multimedia retrieval operates as follows" at the start of the paragraph describing figure 3. (Col. 6, line 35). Appellants have also carefully reviewed the indexing steps in Nelson and cannot find "determining a layout element in a layout datatype from the spatial arrangement of the elements in the document".

In addition, Appellants have carefully reviewed Herz and cannot find any disclosure of the claimed "layout similarity search" and "layout datatype" in claim 14.

Thus, the combination of Nelson and Herz does not teach or suggest every element of claim 14. Therefore, Appellants respectfully request reversal of the rejection of claim 14.

Claims 15-17, which depend directly or indirectly from claim 14, are considered allowable by virtue of their dependencies, because they inherit the patentable subject

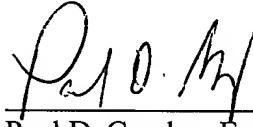
matter of claim 14. Therefore, Appellants respectfully request reversal of these rejections as well.

Conclusion

For the extensive reasons advanced above, Appellant respectfully but forcefully contends that each claim is patentable. Therefore, reversal of all rejections is respectfully requested.

Respectfully submitted,

11-13-03
Date


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Appendix

1. (Previously amended) A method of searching a database to find documents similar to a query document, comprising:

decomposing the query document into different data types, including a layout data type indicating the arrangement of the different data types within the query document;

for one or more of the elements in a first data type, conducting a first data type similarity search to return match results from the database for the one or more elements in the first data type;

for one or more of the elements in a second data type, conducting a second data type similarity search to return match results from the database for the one or more elements in the first data type; and

combining the match results from the first data type similarity search and the second data type similarity search with the layout data type to provide query document match results.

2. (Original) A method as claimed in claim 1, wherein one of the data types is representative of text.

3. (Original) A method as claimed in claim 2, wherein a plurality of the data types are representative of text, separate data types of the plurality being representative of different functional blocks of text.

4. (Previously amended) A method as claimed in claim 1, wherein one of the data types is representative of pictorial images.

5. (Previously amended) A method as claimed in claim 1, wherein one of the data types is representative of graphical images.

6. (Cancelled)

7. (Previously amended) A method as claimed in claim 1, wherein the step of similarity searching to return match results is carried out, separately, for a plurality of elements having between them more than two data types.
8. (Previously amended) A method as claimed in claim 1, where all features of a common data type in the document are treated as one element.
9. (Previously amended) A method as claimed in claim 1, wherein spatially distinct features of a common data type in the document are treated as separate elements.
10. (Previously amended) A method as claimed in claim 1, wherein elements are user selectable or deselectable for the step of similarity searching.
11. (Previously amended) A method as claimed in claim 1, wherein the similarity searching results for separate elements are weighted before combination.
12. (Original) A method as claimed in claim 11, wherein said weighting is user selected.
13. (Original) A method as claimed in claim 11, wherein said weighting is attributed according to a determined significance of each relevant element in the document.
14. (Previously amended) A method of searching a database to find documents similar to a query document, comprising:
 - decomposing the query document into elements of different data types;
 - determining a layout element in a layout datatype from the spatial arrangement of the elements in the document; and
 - for the layout element, conducting a layout similarity search to return match results from the database for the layout element.

15. (Original) A method as claimed in claim 14, wherein the layout similarity search involves searching against templates representative of different document types.

16. (Original) A method as claimed in claim 14, wherein the elements include elements of separate data types representative of different functional blocks of text.

17. (Previously amended) A method as claimed in claim 14, wherein the elements include elements of data types representative of images.